CLAIMS

1. A tactile interface device coupled to a host computer, said interface device outputting tactile sensations to a user based on interactions and events occurring in a graphical environment displayed by said host computer, the interface device comprising:

a housing physically contacted by a user operating said tactile interface device;

an actuator producing periodic inertial forces when said actuator is activated by a control signal; and

a compliant suspension coupling said actuator to said housing, a compliance of said suspension having been selected such that said suspension magnifies said periodic inertial forces for a particular frequency range of said inertial forces, said magnified inertial forces being transmitted to said housing to be felt by said user.

2. A tactile interface device as recited in claim 1 wherein said periodic inertial forces provide periodic vibrations to said housing.

3. A tactile interface device as recited in claim 1 wherein said compliant suspension includes at least one spring member.

4. A tactile interface device as recited in claim 3 wherein said spring member is a leaf spring.

5. A tactile interface device as recited in claim 3 wherein said spring member includes spring beams integrated with said housing of said interface device, said spring beams flexing to provide said compliance.

6. A tactile interface device as recited in claim 3 wherein said spring member includes a diaphragm.

7. A tactile interface device as recited in claim 2 further comprising a damping member coupled between said actuator and said housing, said damping member reducing a peak magnitude of said vibrations.

8. A tactile interface device as recited in claim 7 wherein said damping member includes a foam.

9. A tactile interface device as recited in claim 3 wherein said motor is coupled to a bracket, said bracket coupled to said housing by said at least one spring member.

10. A tactile interface device as recited in claim 1 wherein said host computer provides commands to said interface device that cause said periodic inertial forces to be output.

11. A tactile interface device as recited in claim 10 wherein said host computer is a video game console and said graphical environment is a game running on said console, and wherein said periodic inertial forces are correlated with events and interactions in said game.

12. A tactile interface device as recited in claim 1 wherein said actuator is a rotary motor and wherein said compliant suspension is coupled between a housing of said motor and said housing of said interface device.

13. A tactile interface device as recited in claim 11 wherein an eccentric mass is coupled to a rotating shaft of said motor to provide said periodic inertial forces.

14. A tactile interface device as recited in claim 2 wherein said actuator is a linear motor including an oscillating element to provide said vibrations.

15. A tactile interface device as recited in claim 1 wherein said control signal is provided by a controller on said interface device.

16. A tactile interface device as recited in claim 15 wherein said controller is a local microprocessor, and wherein said local microprocessor receives data from a host computer coupled to said interface device, said host computer running a graphical environment.

17. A tactile interface device as recited in claim 1 wherein said control signal is provided by said host computer such that said host computer controls said periodic inertial forces directly.

18. A method for providing magnified periodic inertial forces in a tactile feedback interface device, said interface device coupled to a host computer and able to provide input from a user to said host computer, the method comprising:

providing an actuator in a housing of said interface device, said actuator operative to output vibrations; and

providing a compliant suspension between said actuator and said housing so that said periodic inertial forces are transmitted to said housing and thereby to said user physically contacting said housing, wherein said suspension has a compliance that has been previously been determined to magnify a magnitude of said inertial forces in a desired frequency range of said inertial forces as said inertial forces are transmitted to said housing.

19. A method as recited in claim 18 wherein said compliance is predetermined to set a resonance frequency of a system including said actuator, suspension and housing at a frequency above a desired operating frequency range for said periodic inertial forces.

20. A method as recited in claim 19 further comprising providing a damping force between said actuator and said housing, said damping force reducing a peak magnitude of said periodic inertial forces.

21. A method as recited in claim 18 wherein said control signal is provided by a controller on said interface device.

22. A method as recited in claim 18 wherein said control signal is provided by said host computer such that said host computer controls said periodic inertial forces directly.

23. A tactile interface device coupled to a host computer, said interface device outputting inertial tactile sensations to a user based on interactions and events occurring in a graphical environment displayed by said host computer, the interface device comprising:

a housing physically contacted by a user operating said tactile interface device;

a manipulandum coupled to said housing and manipulable by said user;

a sensor that detects said manipulation of a manipulandum and provides input information to said host computer based on said manipulation;

an actuator producing inertial forces when said actuator is activated by a control signal; and

a compliant member coupling said actuator to said housing, a compliance of said suspension having been selected such that said suspension magnifies said inertial forces for a particular frequency range of said inertial forces, said magnified inertial forces being transmitted to said housing to be felt by said user.

24. A tactile interface device as recited in claim 23 wherein said inertial forces provide vibrations to said housing.

25. A tactile interface device as recited in claim 24 further comprising an additional actuator that produces additional inertial vibrations, said additional actuator coupled to said housing by an additional compliant member that magnifies said additional vibrations on said housing.